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TARIFF-SEEKING AND THE EFFICIENT TARIFF*

by

Jagdish N. Bhagwati and Robert Feenstra

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1. Introduction

A common reaction to increased import competition is tariff-lobbying by interest groups adversely affected by the competition: a phenomenon christened as "tariff-seeking" in Bhagwati and Srinivasan (1980). Empirical analyses by Cheh (1974), Pincus (1975), Caves (1976) and several others have pointed to the importance of interest group pressures in determining the level of tariffs, and in particular, the importance of tariff-lobbying within labour-intensive industries.

In this paper we shall model the lobbying activities of labour, used intensively in the import competing industry, as a game between it and the government, where the actions of the government are jointly determined by its willingness to grant (or perhaps its inability to resist the granting of) tariffs in the face of political pressure and its desire to maximize social welfare.

We shall suppose that a decrease in the relative price of imports due to increased foreign competition triggers lobbying activity by labour, and that this political pressure leads the government to grant tariff protection. The tariff improves the real wage of labour, but under the assumption of a small country, is welfare-inferior to a position of no tariff and no lobbying. It should be expected, then, that the government will search for policies to reduce the lobbying activity and resulting tariff.

If lump-sum taxation were feasible then the government could simply bribe labour to stop its lobbying activity by offering sufficiently high compensation, and therefore restore the economy to its first-best position with no tariff.

However, in the more realistic case where the government faces a budget constraint, its ability to bribe labour is limited, and in this case it may turn to the revenue created by the tariff itself as a source of funds. By using this revenue to increase labour's real income (defined as the sum of its real wage and this subsidy, as in Bhagwati (1959)), the government can change the amount of lobbying activity and tariff and improve welfare. It cannot, however, eliminate the lobbying activity completely since in that case the tariff is zero and there is no revenue to compensate labour. So in general the equilibrium after optimal government intervention will have a non-zero tariff, and we shall refer to this as the efficient tariff.[0]

Note that the efficient tariff is a second-best concept in that lump sum taxation to raise funds to compensate labour is assumed infeasible. The idea makes a good deal of sense insofar as the revenue raised for redistribution is being thrown up as a side effect of the protection itself, and is not being raised ab initio for the redistribution.[1] Our underlying assumption that one part of the government responds to the protectionist pressure whereas another tries to maximise welfare subject to this response suggests, as some Conference participants wittily remarked, a "left brain, right-brain" or an "ego versus id" type of approach to the

political economy at hand. It does reflect, however, the classic division and confrontation between the (pro-trade) Executive and the (lobbying-dominated) Legislature in countries such as the United States.

In section 2 we determine the equilibrium tariff level based on optimal lobbying activity by labour. In section 3 we introduce the possibility of government intervention in the form of conditional subsidies to labour, and derive the efficient tariff. While one might expect that it is optimal for the government to reduce the amount of lobbying and resulting tariff, it is also possible for the optimal policy to involve an increase in the level of lobbying and tariff. This paradox can arise if, given the existing distortion caused by the tariff, the shadow price of the lobbying activity is negative, so that an increase in the lobbying activity may be socially desirable (for analyses of negative project shadow prices see Srinivasan and Bhagwati (1978), Bhagwati, Srinivasan, and Wan (1978), and Bhagwati and Srinivasan (1980)). In section 4 we derive a necessary and sufficient condition for this possibility to arise. Further discussion and conclusions are given in sections 5 and 6.

2. Optimal Lobbying

We shall adopt the usual 2x2 HOS (Heckscher-Ohlin-Samuelson) model, with industry 1 labour-intensive and import competing. Choosing commodity 2 as the numeraire, let p^* and $p = p^* (1 + t)$ denote the foreign and domestic relative price of commodity 1, respectively, where t is the ad valorem tariff rate and under the assumption of a small country p^* is given as a parameter by world

trade. The consumption and production of good i are denoted by X_i and Y_i, i = 1,2, and the factor prices and given endowments of labour and capital are denoted by w, r, $\bar{L}$ and $\bar{K}$, respectively.

Suppose that the foreign relative price of good 1 falls from p_o^* to p^* due to increased import competition, and that this triggers tariff-lobbying by labour, whose real wage has fallen. Following Findlay and Wellisz (1979), we shall assume that this lobbying activity takes the form of hiring labour L_t and capital K_t to determine a tariff level, $t = f(L_t, K_t)$, where f is increasing and concave. This lobbying function should be interpreted as derived from given political behaviour and institutions, such as the desire of politicians to maximize their probability of re-election.[2] We shall denote minimum costs at which the tariff rate t can be obtained as $C(t,w,r)$. A reasonable form for the lobbying cost function is,

$$C(t,w,r) = \left\{ \frac{t\ \phi(w,r)}{\max\{0,\ (p_o^* - p^*\ (1 + t)\}} \right\} \qquad (1)$$

where $\phi(w,r)$ is increasing and quasi-concave. For this cost function, as the tariff increases and $p^*(1 + t)$ approaches p_o^* so that labour's real wage approaches the level obtained before the increased import competition, costs become arbitrarily large. Also, if import competition were to decline ($p^* > p_o^*$) and the labour's real wage improve, then the costs of lobbying for any positive tariff

are arbitrarily large. This cost function is meant to embody the notion that before the change in the terms of trade the historically determined distribution of income between labour and capital was "acceptable" in the sense that lobbying would be ineffective (lobbying costs would be arbitrarily large), and it is only after the shift in the terms of trade that lobbying becomes feasible for the factor whose real wage has deteriorated. Adopting an analogous lobbying cost function for capital, and for the case we are considering where $p_o^* > p^*$, capitalists will not lobby after the change in the terms of trade because their real rental has improved.[3]

We shall assume that all labourers have an identical linearly homogeneous utility function, and denote the maximum utility obtainable with the relative price p and income I by V(p,I). After the fall in the foreign relative price of commodity 1 from p_o^* to p^*, labour's lobbying problem is,

$$\max_{t \geq 0} \quad V\{p^*(1 + t),\ w\bar{L} - C(t,w,r)\}, \tag{2}$$

where

$(w\bar{L} - C(t,w,r))$ is labour's income net of lobbying costs. Using Roy's identity,[4] the first order conditions for this problem can be written as,

$$p^*(\bar{L}\frac{dw}{dp} - X_1^L) = \frac{dC}{dt}, \tag{3a}$$

where,

$$\frac{dC}{dt} = \left(w \frac{\partial L_t}{\partial t} + r \frac{\partial K_t}{\partial t} \right) + p^* \left(L_t \frac{dw}{dp} + K_t \frac{dr}{dp} \right) \qquad (3b)$$

The left hand side of (3a) is the change in labour's real income due to a change in the tariff, $\frac{dw}{dp} > 0$ and $(\bar{L} \frac{dw}{dp} - X_1^L) > 0$ where X_1^L is labour's consumption of good 1,[5] while the right hand side is the marginal cost of the tariff, including both the direct effect on costs of hiring more inputs and the indirect effect of changing factor prices.

The solution t^* to labour's lobbying problem is illustrated in Figure 1, where C(t) are costs as a function of t including general equilibrium changes in factor prices, and the "benefits" curve B(t) has slope $p^*(\bar{L} \frac{dw}{dp} - X_1^L)$. For the lobbying cost function given in (1) costs approach infinity as t approaches $\tilde{t} = (p_o^*/p^*) - 1$, and this implies that $t^* < \tilde{t}$, so the domestic price-ratio $p = p^* (1 + t^*)$ after tariff lobbying lies between the foreign price-ratios p_o^* and p^* obtaining before and after the increase in import competition, respectively. Note that multiple solutions to (3) are possible.[6] Assuming that lobbying costs are shared equally by all labourers, the net wage after lobbying is $(w - C(t^*,w,r)/\bar{L})$.

3. Government Intervention

The equilibrium with optimal lobbying by labour is welfare-inferior

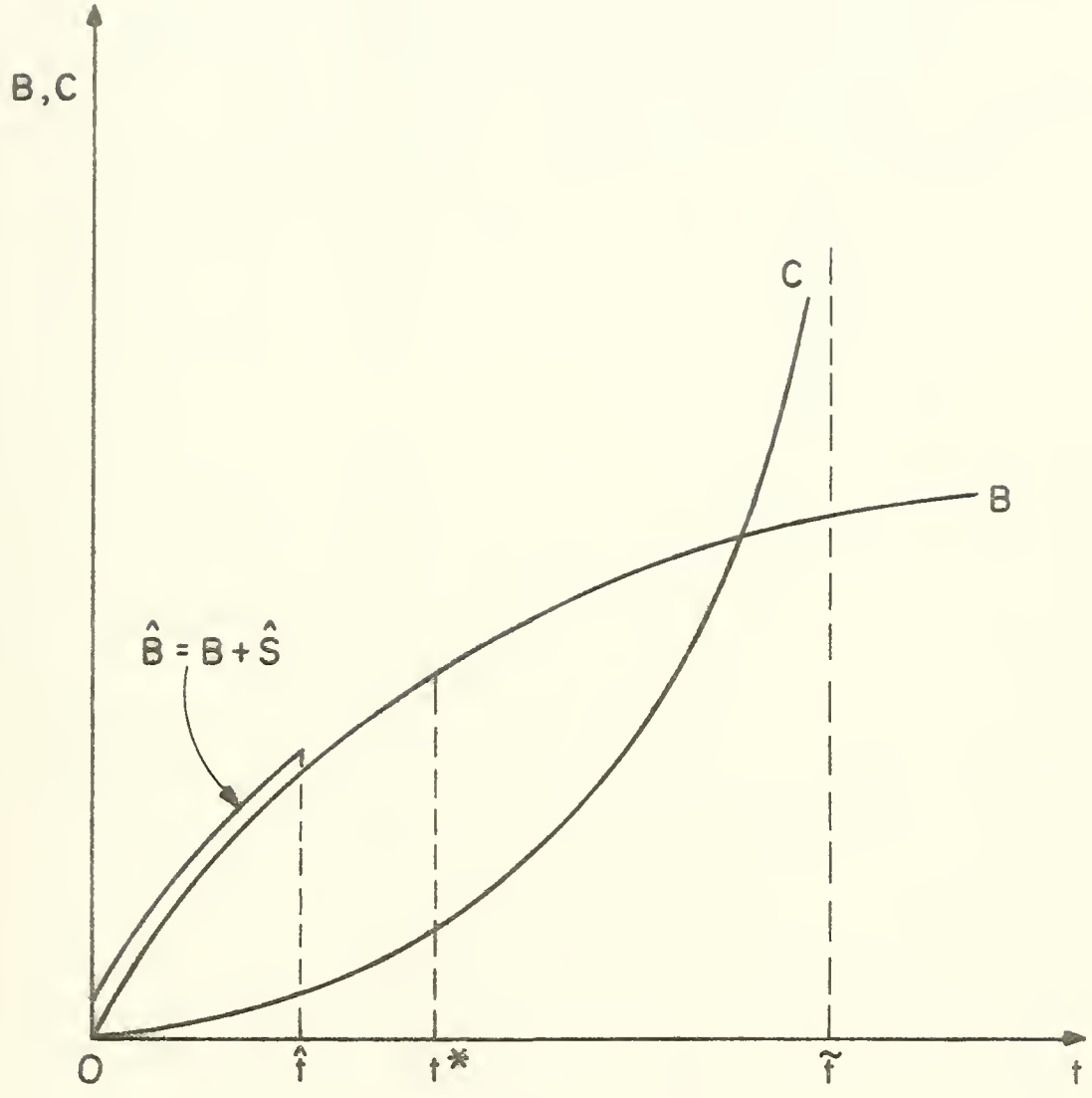

Figure 1

to a position of no lobbying and no tariff. Thus, as argued in section 1, the government may turn to the revenues created by the tariff itself as a source of funds to compensate labour and improve welfare. In order to be effective, this compensation will take the form of subsidy payments which are conditional on the tariff rate: for the case in which the government wishes to reduce the level of lobbying and tariff to $\hat{t} < t^*$ it would offer the subsidy $\hat{S}(t)$ defined by,

$$\hat{S}(t) = \begin{cases} S(\hat{t}) \text{ for } t \leq \hat{t} \\ 0 \text{ for } t > \hat{t} \end{cases} \qquad (4)$$

where $S(\hat{t})$ is chosen such that labour will accept the conditional subsidy. This bribe is illustrated in Figure 1, from which it is clear that the minimum level of $S(\hat{t})$ which labour will accept is,

$$S(\hat{t}) = \left[B(t^*) - C(t^*)\right] - \left[B(\hat{t}) - C(\hat{t})\right], \qquad (5)$$

in which case labour is indifferent between $\hat{t}$ and t^*. The schedule of minimum subsidy payments $S(t)$ is implicitly defined by (5), or equivalently,

$$V(p^*(1 + t), \bar{wL} - C(t,w,r) + S(t)) = V_L^*, \qquad (5)'$$

where V_L^* is the utility of labour in the optimal lobbying equilibrium. The subsidy payments are illustrated in Figure 2. Note that for the case in which the government wishes to increase the level of lobbying and tariff to $\hat{t} > t^*$ it would offer the conditional subsidy $\hat{S}(t)$ defined by,

$$\hat{S}(t) = \begin{cases} 0 \text{ for } t < \hat{t} \\ S(\hat{t}) \text{ for } t \geq \hat{t} \end{cases}, \qquad (4)$$

where with $S(t)$ chosen according to (5) or (5)' labour would be

willing to accept this compensation.

Using the subsidy payments $S(t)$ the government can shift the equilibrium of the economy to any desired position with $0 \leq t < \tilde{t}$, and we assume that it wishes to choose the position which maximizes social welfare.[7] Assuming that the government places equal weight on all individuals when evaluating social welfare, and that capitalists have the same linearly homogeneous utility function as labourers, social welfare is given by,

$$\begin{aligned} U &= V(p^*(1+t),\ w\bar{L} + r\bar{K} + T - C(t,w,r)) \\ &= V(p^*(1+t),\ w\bar{L} - C(t,w,r,) + S(t)) \\ &\quad + V(p^*(1+t),\ r\bar{K} + T - S(t)) \\ &= V_L^* + V(p^*(1+t),\ r\bar{K} + T - S(t)) , \end{aligned}$$

where T denotes redistributed tariff revenues. Since V_L^* is a constant, maximizing social welfare is equivalent to maximizing $V_K \equiv V(p^*(1+t),\ r\bar{K} + T - S(t))$, which is the utility of capitalists when they receive their rental income and redistributed tariff revenues less subsidy payments. We explicitly rule out the possibility of lump-sum taxation of capital, and so the net income distributed to capital must be non-negative. Thus, the governments problem can be stated as,

$$\max_{t \geq 0} \quad V_K \text{ subject to } T - S(t) \geq 0. \tag{6}$$

The tariff rate t_e given by the solution to (6) is the efficient

tariff. The game-theoretic equilibrium at which the efficient tariff obtains is a Stackelberg equilibrium with the government as the Stackelberg leader: in chosing its optimal policy labour takes any conditional subsidy offer $\hat{S}(t)$ as given, whereas the government includes the reaction of labour to different subsidy offers in its decision framework.

The efficient tariff may be below or exceed the optimal labour-lobbying tariff t^*, where the latter possibility can arise if the shadow price of the lobbying activity is negative. Consider first the "normal" case where it is optimal for the government to bribe labour to reduce the lobbying activity and resulting tariff. Then the minimum feasible tariff rate and maximum social welfare is clearly attained where $T = S(t)$, so that all of the tariff revenue is used to compensate labour and none is distributed to capital. This corner solution is shown as $t_e < t^*$ in Figure 2 where $\bar{t}$ is the prohibitive tariff, and $\bar{t} > \tilde{t}$ since it is assumed that industry 1 was import competing before the initial shift in the terms of trade.[8] For the latter case where it is optimal for the government to increase the level of lobbying and tariff from t*, social welfare is maximized at a tariff rate between t* and t'. The point t' is defined by $t' > t^*$ and $T = S(t')$, and the efficient tariff is necessarily less than t'. This result can be seen as follows. Using the subsidy payments S(t) labour obtains the same utility at t* and t', but since at t' all tariff revenues are used to compensate labour and the rental on capital is less than at t* (by the Stolper-Samuelson theorem),

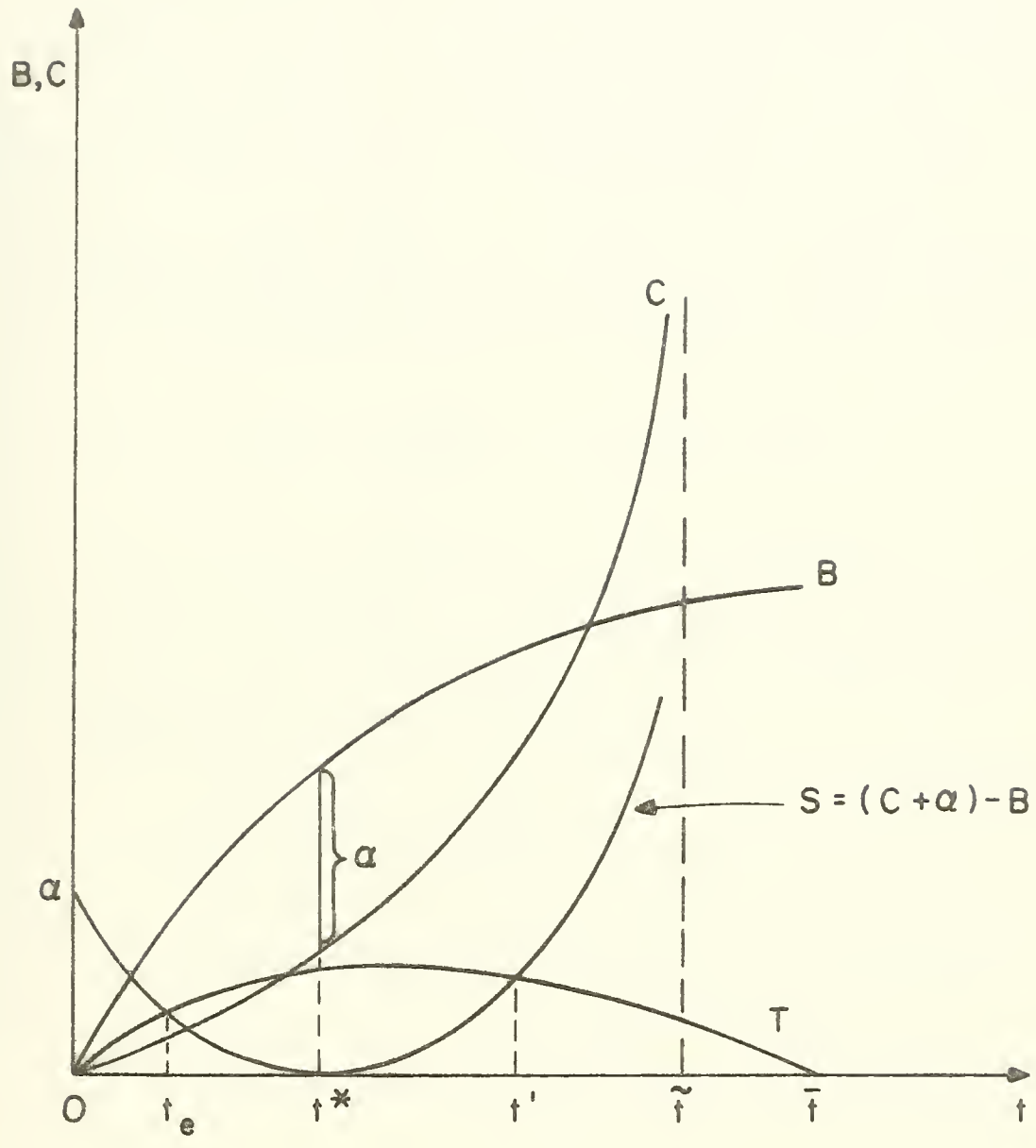

Figure 2

capital is necessarily worse off at t' as compared with t*. Therefore, social welfare is lower at t' than at t*, and so for the case we are considering where a marginal rise in the tariff rate from t* increases social welfare, the maximum is clearly obtained between t* and t'.[9]

When can the latter paradoxical case arise? As we shall demonstrate in the following section, starting at any tariff rate t, $0 \leq t < \tilde{t}$, an increase in the amount of lobbying activity and resulting tariff due to government intervention is welfare-improving if and only if,

$$- \frac{d}{dt}\left(p^* Y_1 + Y_2\right) < t(p^*)^2 \left(\left.\frac{\partial X_1}{\partial p}\right|_u - \frac{\partial Y_1}{\partial p} \right), \qquad (7)$$

whereas the optimal intervention is to decrease the amount of lobbying and tariff if the inequality in (7) is reversed.[10] The left hand side of (7) is the change in national income evaluated at international prices due to a change in the level of lobbying activity and tariff, which is the shadow price of the lobbying activity. The right hand side of (7) reflects the change in tariff revenue due to substitution effects in consumption and production, and is negative since,

$$\left.\frac{\partial X_1}{\partial p}\right|_u < 0 \text{ and } \frac{\partial Y_1}{\partial p} > 0.$$

Thus, an increase in the lobbying activity and tariff is optimal if and only if the shadow price of the lobbying activity is negative and sufficiently large in absolute value.

4. Derivation of Optimal Government Intervention

The change in the subsidy given to labour needed to keep labour's utility at its optimal lobbying level can be calculated from (5)' as,

$$\frac{dS}{dt} = -\{p^*(\bar{L}\frac{dw}{dp} - X_1^L) - \frac{dC}{dt}\}. \tag{8}$$

When the tariff revenues less subsidy payments are redistributed to capitalists their utility is $V_K = V(p^*(1+t), r\bar{K} + T - S(t))$, and,

$$\frac{dV_k}{dt} = \frac{\partial V}{\partial I}\{p^*(\bar{K}\frac{dr}{dp} - X_1^K) + \frac{dT}{dt} - \frac{dS}{dt}\},$$

where X_1^K is the consumption of good 1 by capitalists and $dr/dp < 0$. Then $dV_K/dt > 0$, in which case it is optimal for the government to bribe labour to increase the amount of lobbying and resulting tariff, if and only if,

$$(\frac{dT}{dt} - \frac{dS}{dt}) > -p^*(\bar{K}\frac{dr}{dp} - X_1^K). \tag{9}$$

The right hand side of (9) is the real income loss of capitalists due to a higher tariff, and so the higher tariff is preferred if and only if the net gain in tariff revenue exceeds this loss.

Equation (9) clarifies the nature of the optimal intervention for the case where it is optimal for the government to increase the

level of lobbying and tariff from t* (i.e. (9) holds at t*). The right hand side of (9) is positive (by the Stopler-Samuelson theorem), and in a neighbourhood of t' it can be seen that dT/dt < dS/dt, so that (9) cannot hold. The efficient tariff in this case is obtained when (9) holds with equality, which will occur at a point between t* and t'. We can also see that the efficient tariff satisfies dT/dt > 0, which implies that the efficient tariff is necessarily less than the maximum revenue tariff for which dT/dt = 0.

Tariff revenues are given by,

$$T = tp^*(X_1(p^*(1+t), w\bar{L} + r\bar{K} + T - C) - Y_1),$$

where $X_1 = X_1^L + X_1^K$, from which we can calculate that,

$$\begin{aligned}\frac{dT}{dt} &= \beta\{p^*(X_1-Y_1) + t(p^*)^2(\frac{\partial X_1}{\partial p}\Big|_u - \frac{\partial Y_1}{\partial p})\} \\ &+ \beta tp^*(\frac{\partial Y_1}{\partial \bar{L}}\frac{dL_t}{dt} + \frac{\partial Y_1}{\partial \bar{K}}\frac{dK_t}{dt}) \\ &+ (\beta-1)(p^*\bar{L}\frac{dw}{dp} + p^*\bar{K}\frac{dr}{dp} - p^*X_1 - \frac{dC}{dt}),\end{aligned} \tag{10}$$

where $\beta = (1 - tp^*\frac{\partial X_1}{\partial I})^{-1} > 0$ so long as good 2 is not inferior.[11] We also have,

$$\begin{aligned}\frac{dS}{dt} - p^*(\bar{K}\frac{dr}{dp} - X_1^K) \\ = -(p^*\bar{L}\frac{dw}{dp} + p^*\bar{K}\frac{dr}{dp} - p^*X_1 - \frac{dC}{dt}),\end{aligned}$$

using (8);

$$= - (p^*(\bar{L}-L_t) \frac{\partial Y_1}{\partial \bar{L}} + p^*(\bar{K}-K_t) \frac{\partial Y_1}{\partial \bar{K}} - p^*X_1 - C_t),$$

using (3b), the reciprocity relations $\frac{dw}{dp} = \frac{\partial Y_1}{\partial \bar{L}}$

and $\frac{dr}{dp} = \frac{\partial Y_1}{\partial \bar{K}}$, and since $C_t = w \frac{\partial L_t}{\partial t} + r \frac{\partial K_t}{\partial t}$;

$$= p^*(X_1 - Y_1) + C_t, \qquad (11)$$

since $Y_1 = (\bar{L}-L_t) \frac{\partial Y_1}{\partial \bar{L}} + (\bar{K}-K_t) \frac{\partial Y_1}{\partial \bar{K}}$.

Using (10) and (11), condition (9) becomes,

$$t(p^*)^2 \left(\frac{\partial X_1}{\partial p}\Big|_u - \frac{\partial Y_1}{\partial p}\right) + tp^*\left(\frac{\partial Y_1}{\partial \bar{L}} \frac{dL_t}{dt} + \frac{\partial Y_1}{\partial \bar{K}} \frac{dK_t}{dt}\right) - C_t > 0. \qquad (9)'$$

To further simplify (9)' we must introduce the concept of <u>shadow prices</u> of primary factors at the tariff-distorted equilibrium. Letting a_{ij} denote the cost-minimizing unit-output requirement of factor i in industry j, evaluated at the tariff-distorted domestic price-ratio $p=p^*(1+t)$, the factor prices w and r satisfy

$$p^*(1+t) = a_{L1}\, w + a_{K1}\, r \tag{12a}$$

$$1 = a_{L2}\, w + a_{K2}\, r,$$

whereas the shadow factor prices w^* and r^* are defined by,

$$p^* = a_{L1}\, w^* + a_{K1}\, r^*$$

$$1 = a_{L2}\, w^* + a_{K2}\, r^*. \tag{12b}$$

Using (12a) and (12b) it can be shown that,

$$tp^* \frac{dw}{dp} = w - w^*, \text{ and}$$

$$tp^* \frac{dr}{dp} = r - r^*. \tag{13}$$

Using (13) and the reciprocity relations we then have,

$$tp^* \left(\frac{\partial Y_1}{\partial \bar{L}} \frac{dL_t}{dt} + \frac{\partial Y_1}{\partial \bar{K}} \frac{dK_t}{dt}\right)$$

$$= C_t - \left(w^* \frac{\partial L_t}{\partial t} + r^* \frac{\partial K_t}{\partial t}\right) + \theta, \tag{14}$$

where

$$\theta = t(p^*)^2 \left\{ \frac{\partial L_t}{\partial w}\left(\frac{dw}{dp}\right)^2 + 2\,\frac{\partial L_t}{\partial r}\left(\frac{dw}{dp}\right)\left(\frac{dr}{dp}\right) + \frac{\partial K_t}{\partial r}\left(\frac{dr}{dp}\right)^2 \right\}$$

$$= t^{-1}(w^*, r^*) \begin{bmatrix} C_{ww} & C_{wr} \\ C_{rw} & C_{rr} \end{bmatrix} \begin{pmatrix} w^* \\ r^* \end{pmatrix} \leq 0,$$

since $C(t,w,r)$ is concave in (w,r).

Substituting (14) into (9)', the necessary and sufficient condition for an increase in the level of lobbying and tariff to be welfare-improving is,

$$\left(w^* \frac{\partial L_t}{\partial t} + r^* \frac{\partial K_t}{\partial t}\right) - \theta < t(p^*)^2 \left(\frac{\partial X_1}{\partial p}\Big|_u - \frac{\partial Y_1}{\partial p}\right). \qquad (9)''$$

Finally, note that national income evaluated at international prices is given by,

$$p^*Y_1 + Y_2 = w^*(\bar{L}-L_t) + r^*(\bar{K}-K_t),$$

from which it can be shown that,

$$-\frac{d}{dt}\left(p^*Y_1 + Y_2\right) = \left(w^* \frac{\partial L_t}{\partial t} + r^* \frac{\partial K_t}{\partial t}\right) - \theta. \qquad (15)$$

Substituting (15) into (9)" we obtain condition (7), as desired.

5. A Sufficient Condition for Welfare Improvement in the Lobbying Equilibrium

In the absence of any tariff-lobbying the fall in the relative price of imports due to foreign competition, while harmful to the real wage of labour, is welfare-improving. The lobbying activity reduces welfare from that point by establishing a tariff and using resources, and so it is possible for social welfare to be lower after the improvement in the terms of trade and resulting lobbying and tariff than before. However, as shown in Figure 3, a sufficient condition for welfare to be higher after the improvement in the terms of trade and lobbying is easily derived. (Note that the efficient tariff equilibrium is no worse than the lobbying equilibrium, so that our sufficiency condition extends to it as well.)

The equilibrium production points before and after the fall in the relative price of imports (and with no lobbying) are P_0 and P_1, respectively, in Figure 3; OI is the income-consumption path corresponding to the domestic price-ratio in the tariff-distorted equilibrium. For the lobbying cost function given in (1), the domestic price-ratio with optimal labour lobbying lies between the international price-ratios obtaining before and after the change in the terms of trade (so that, $\tilde{P}$ is spanned by P_0 and P_1). Production is shifted from $\tilde{P}$ to P_t by the lobbying activity and consumption is at C_t. For the given tariff, an increase in lobbying costs would shift consumption down along OI, but so long as the consumption point does

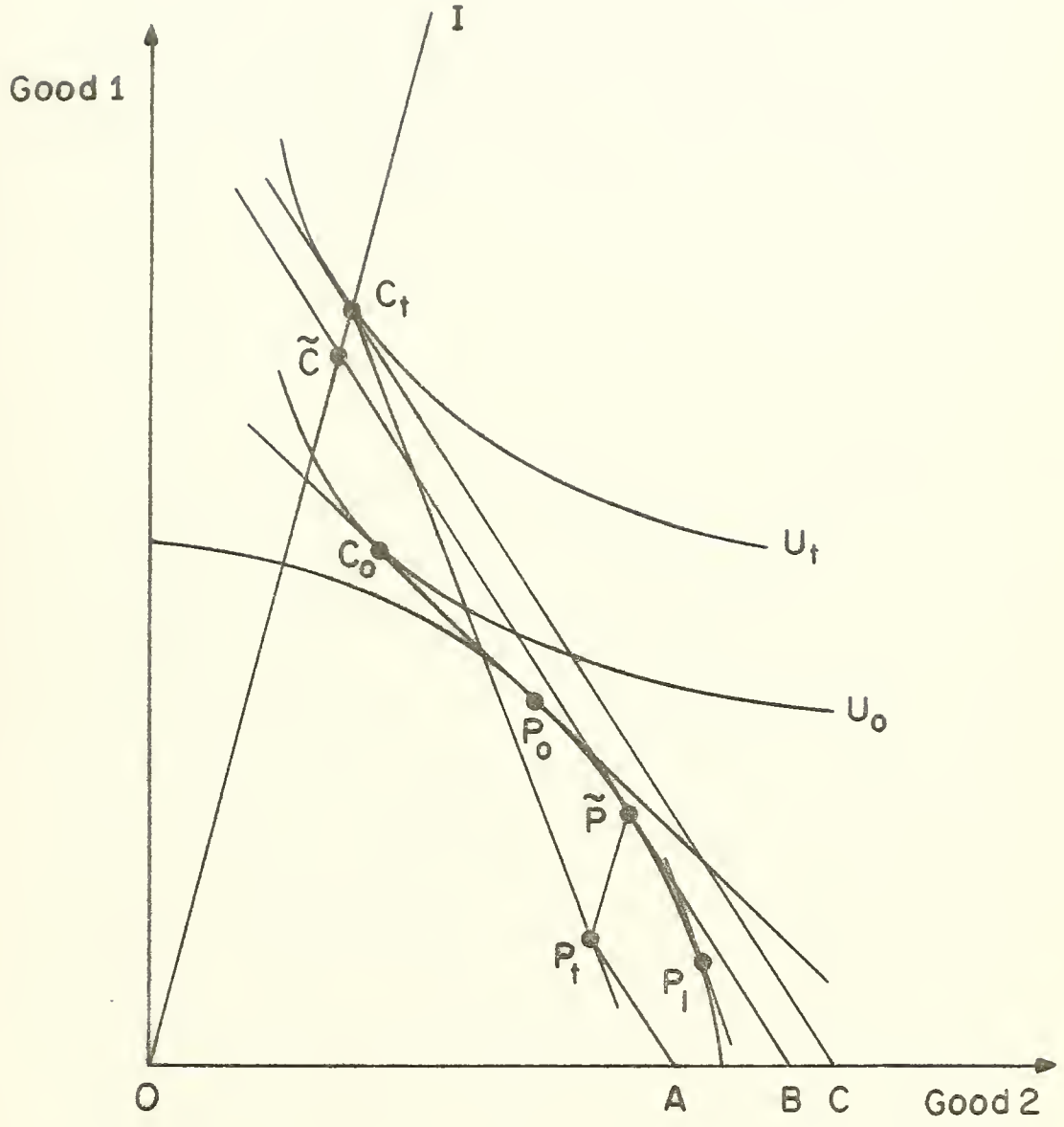

Figure 3

not fall below $\tilde{C}$ welfare U_t must be higher than U_0. (Note that this condition is sufficient but not necessary, and that $\tilde{C}$ is a hypothetical consumption point which does not correspond to any trade equilibrium.) The condition for C_t to exceed $\tilde{C}$ is that tariff revenues AC exceed lobbying costs AB, and so this is a sufficient condition for welfare to improve due to the initial fall in the relative price of imports.

6. Conclusions

In conclusion, we have derived the efficient tariff as obtaining in the Stackelberg equilibrium of a game between the government and labour, where labour lobbies for a tariff and the government responds by granting some tariff protection but also using tariff revenues to compensate labour directly, and therefore change the amount of lobbying. For the lobbying cost function given in (1), the real rental on capital improves due to the improvement in the terms of trade despite the lobbying (i.e. in moving from P_0 to P_t in Figure 3), labour's real income is damaged by the increased foreign competition but is higher than in the absence of lobbying, and so long as tariff revenues exceed lobbying costs in the final equilibrium the rise in terms of trade improves social welfare.

FOOTNOTES

[0]Johnson's (1960) concept of the "scientific tariff" related to that tariff structure which would minimize the cost of certain "non-economic" objectives such as "diversification, industrialization, or agriculturization", "national-self-sufficiency and independence". As such, it was a constrained, second-best concept: the second best nature of the tariff structure relating to the fact that the first-best solution is additionally being constrained by the non-economic objectives. As noted in the text, however, our concept of the "efficient tariff" is also a second-best one insofar as the lobbying activity cannot be eliminated by bribing labour with lump-sum transfers in a first-best solution. The efficient tariff, however, minimizes the welfare loss from the successful lobbying for a tariff by utilizing an added policy instrument which is perfectly appropriate to the problem (and which was earlier disregarded by trade theorists following the Meade assumption that all tariff revenues are given away as lump sum transfers): namely, the tariff revenues which can be used to bribe labour into accepting a lower tariff.

[1]Gene Grossman has pointed out to us that something very similar in spirit to the efficient tariff notion is implied by the Carter administration's proposal to use the revenue raised

from the oil tariff and the windfall profits tax to compensate the losers from higher-priced oil. David Richardson (1980, p. 14) also notes that a provision of the Trade Act of 1974 was to provide funds out of tariff revenues for the retraining of trade-displaced workers.

[2]Brock and Magee (1978) model politicians as maximizing their probability of re-election in a very general game-theoretic framework.

[3]Aside from the direct costs of hiring factors to lobby, the lobbying cost function can also be interpreted as including costs of labour union activity which induces tariff-lobbying by entrepeneurs. For example, if workers strike in response to a lowered real wage, this could lead to greater tariff-lobbying by entrepeneurs in an attempt to meet union wage demands without reducing the return on capital. Labour would have to bear the costs of not receiving wage income during the strike (though these costs may be mitigated by government compensation), as well as some portion of the opportunity costs of capital unemployed during the strike. Within the context of our model we are assuming that the costs to labour $C(t,w,r)$ include the full opportunity cost of unemployed capital as well as the lobbying costs of entrepeneurs in industry 1; we also do not consider the role of government unemployment compensation.

[4]Roy's identity states that $X_1 = \frac{-\partial V}{\partial p} / \frac{\partial V}{\partial I}$.

[5]We have $(\bar{L}\frac{dw}{dp} - X_1^L) > 0$ since, by the Stolper-Samuelson theorem, labour's real wage improves in terms of either good and so the rise in real income exceeds the increased cost of consumption.

[6]Of course, if C(t) is convex and B(t) concave then the solution is unique. The convexity of w(p), which is a component of B(t), is investigated in Kemp and Khang (1975).

[7]Note that the government's desire to maximize social welfare is consistent with its willingness to grant tariff protection, in that the latter can represent its reaction to distributive equity whereas the former corresponds to allocative efficiency. We shall assume that all utility functions are identical and linearly homogeneous, and so the maximization of social welfare is not directly related to the distribution of income between labour and capital (in contrast to the case of strictly concave utility functions), but rather, leads to the most efficient allocation of resources.

[8]Note that the tariff revenue T need not be "single-peaked" as shown in Figure 2. If T = S(t) at numerous values of t, then the optimal value of t when the government wishes to reduce the lobbying activity and resulting tariff is the minimum t for which T = S(t).

[9] If $T = S(t')$ and $t' > t^*$ at numerous values of t', then the efficient tariff when the government wishes to increase the level of lobbying and tariff from t^* must lie between t^* and the maximum value of t'.

[10] An interior maximum of social welfare is obtained when (7) is satis fied with equality (and the second order conditions for maximization are satisfied).

[11] Since marginal propensities to consume must sum to unity we have $(1 - tp^* \frac{\partial X_1}{\partial I}) = (p^* \frac{\partial X_1}{\partial I} + \frac{\partial X_2}{\partial I})$ and this expression is positive so long as good 2 is not inferior.

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